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"Recycled paper for food packaging: burden of disease methodology to link sustainability and safety"

Elena Boriani^{*1,2}, Eelco Pieke¹, Tine Hald¹, Sara Pires¹, Julie Boberg¹, Lea Sletting Jakobsen¹

¹ National Food Institute, Technical University of Denmark, Kgs. Lyngby, Denmark

² Global Decision Support Initiative, Technical University of Denmark, Kgs. Lyngby, Denmark

Corresponding author: Elena Boriani, email : ebor@food.dtu.dk

Background: Semi-quantitative analytical experimental studies¹ applied to recycled paper used as food contact materials have shown presence of endocrine –disrupting chemicals in pizza boxes made from recycled paper, and provided evidence that some of these chemicals will likely migrate from the packaging into the food. Therefore, the sustainability of recycling should be associated to safety because of the probable source of exposure to endocrine –disrupting chemicals from recycled food contact material which could lead to adverse health effects.

Purpose: The aim of this study is to estimate the burden of disease due to exposure to endocrine-disrupting chemicals present in food packaging and discuss the possible link between this study and a life cycle assessment of pizza boxes made from recycled paper. We consider, as example of endocrine-disrupting chemical, the high molecular weight phthalate DEHP (1,2-bis(2-ethylhexyl) benzene-1,2-dicarboxylate) from the consumption of commercially prepared (take-away) pizza in Denmark and estimate disease burden in terms of disability adjusted life years, DALYs^{1,2}.

Methodology: We applied a burden of disease model consisting of three submodules (Fig1).

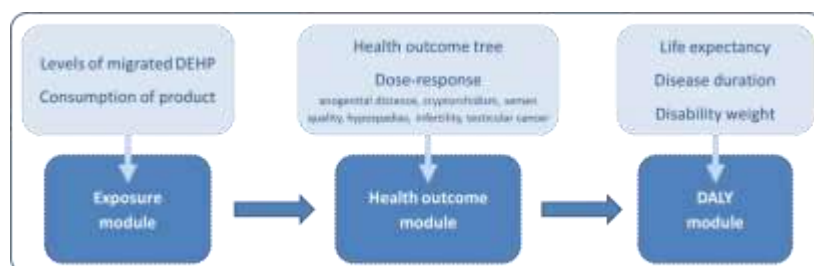


Fig 1: The three modules of the burden of disease model

Expected outcomes: Our estimates will:

- Develop an approach to estimate the disease burden of endocrine-disrupting chemicals, filling in a knowledge gap at national and international levels.
- Allow for the integration of health impact assessment of a food contact material with the environmental impact and sustainability approach.
- Facilitate the evaluation and comparisons of different packaging alternatives by taking into account both human health and environmental impact of the material.

¹Pieke EN, Granby K, Trier X, Smedsgaard J. A framework to estimate concentrations of potentially unknown substances by semi-quantification in liquid chromatography electrospray ionization mass spectrometry, In *Analytica Chimica Acta*, Volume 975, 2017, Pages 30-41, ISSN 0003-2670,

²Poenaru D, Pemberton J, Frankfurter C et al (2013) Establishing disability weights for congenital paediatric surgical disease: a cross-sectional, multi-modal study. *Lancet* 381:S115, ³Salomon JA, Murray CJL. Estimating health state valuations using a multiple method protocol. In: *Summary Measures of Population Health Concepts, Ethics, Measurement and Applications*. Geneva: World Health Organization; 2002. p. 487–99.